



PURDUE

APPLIED RESEARCH INSTITUTE

Mark J. Lewis
President & CEO

November 7, 2023

PARI applies the intellectual capital and resources of Purdue University to critical problems in national security, infrastructure, and global development.

- 501(c)3 non-profit corporation owned by Purdue University, led by a President & CEO, and operated by the office of the Executive Vice President for Research within the Office of the President
- University-Affiliated Research Institute eligible for CICA-3 sole-source contracting
- Funded with an initial ~ \$120M investment in people and facilities as part of the Purdue Next Moves Campaign
- Designed to conduct classified work including research and development, and test and evaluation
- Leverages campus faculty and staff, but also has its own dedicated staff
- Separate hiring and contracting authorities

Purdue's Research Portfolio

National and Economic Security –
providing a safe and secure livelihood for all



Advancing Health and Life Sciences



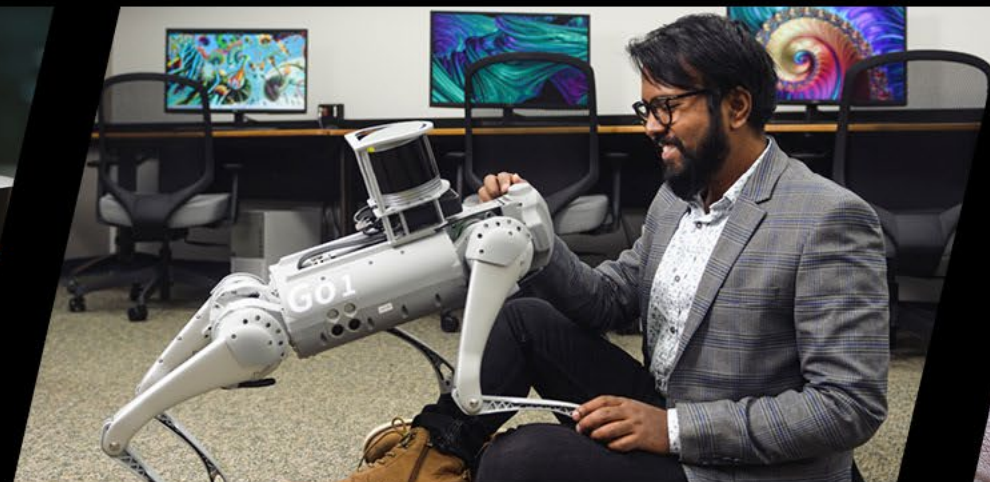
Providing National Security and Defense



Saving Energy and Protecting the Environment



Modernizing our Infrastructure



Ensure economic prosperity through data science and AI



Feeding the world

A Unique Ecosystem of Innovation

Powering interdisciplinary solutions to the world's key needs

Colleges

PURDUE
APPLIED RESEARCH INSTITUTE

**Institutes
& Centers**

**Discovery
Park
District**

“Purdue Research is flexibly structured to enable interdisciplinary breakthroughs across Purdue and to meet the needs of our governmental, corporate, and academic partners.”

Karen Plaut, Executive Vice
President for Research

PARI Divisions

- Hypersonics Lab (PHL)
 - Hypersonics Advanced Manufacturing Technology Center (HAMTC)
 - Hypersonics Pulse (HYPULSE) shock and expansion wind tunnel
 - Mach 8 Quiet Tunnel
- Microelectronics Lab (PML)
- Infrastructure Innovation Lab (PIIL)
 - Infrastructure Research and Innovative Solutions (IRIS)
- Energetics Lab (PEL)
- Tech Acceleration and Innovation Lab (PTI)
 - Global Development and Innovation (GDI)
 - Digital Innovation in Agri-food Systems Laboratory (DIAL Ventures)

PARI Senior Leadership

- **President & CEO: Mark J. Lewis, ScD**
 - Former DDR&E for Modernization, Acting USD(R&E), and USAF Chief Scientist
 - 35 year career in academia, also past President of AIAA, led the White House Science & Technology Policy Institute, and founding director of Emerging Technologies Institute
- **Chief Operating Officer: Kevin Massey, PhD**
 - Former DARPA PM, GTRI, Ford, Pratt & Whitney, Raytheon, and Leidos
 - Academic career leading departments in RMIT, member USAF SAB
- **Chief External Relations Officer: Ms. Kea Matory, JD**
 - Director of Legislative Policy NDIA, Legislative Affairs Officer USMC, Attorney,
 - Background in journalism, ABC News Greater Los Angeles
- **Chief Legal Officer: Mr. Gerald Trepkowski, JD, LL M**
 - Senior Counsel at JHU-APL, Senior Counsel F-35, SAIC
 - USAF Associate General Counsel
- **Chief of Staff: Ms. Camilla Shanley**
 - Senior Manager, Emerging Technologies Institute
 - Program Manager, Leadership and Team Building Ropes Course, GWU

PARI Board of Advisors

- Hon. Lisa Hershman, Chair
- Gen Herbert J. "Hawk" Carlisle, USAF, Ret.
- Paul Madera, Co-Founder & Managing Director, Meritech Captial
- Michael McCloskey, Co-Founder & CEO, Select Milk Products
- ... and more to come...

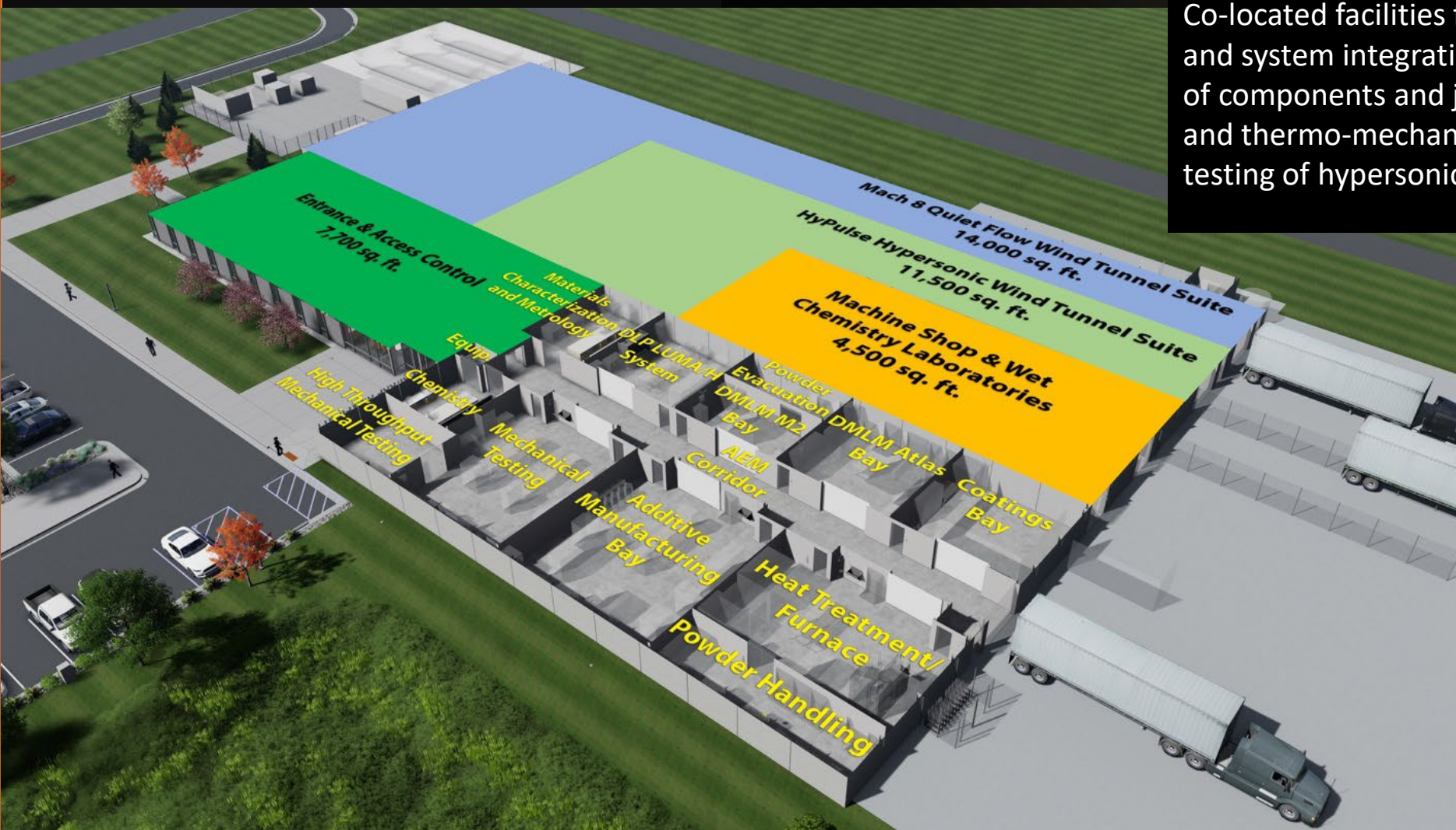
PARI Hypersonics Lab

Hypersonics and Applied Research Facility (HARF)

Co-located facilities for design of components and system integration, additive manufacturing of components and joining of sub-assemblies, and thermo-mechanical and wind-tunnel testing of hypersonic sub-systems.

HAMTC instrumentation:

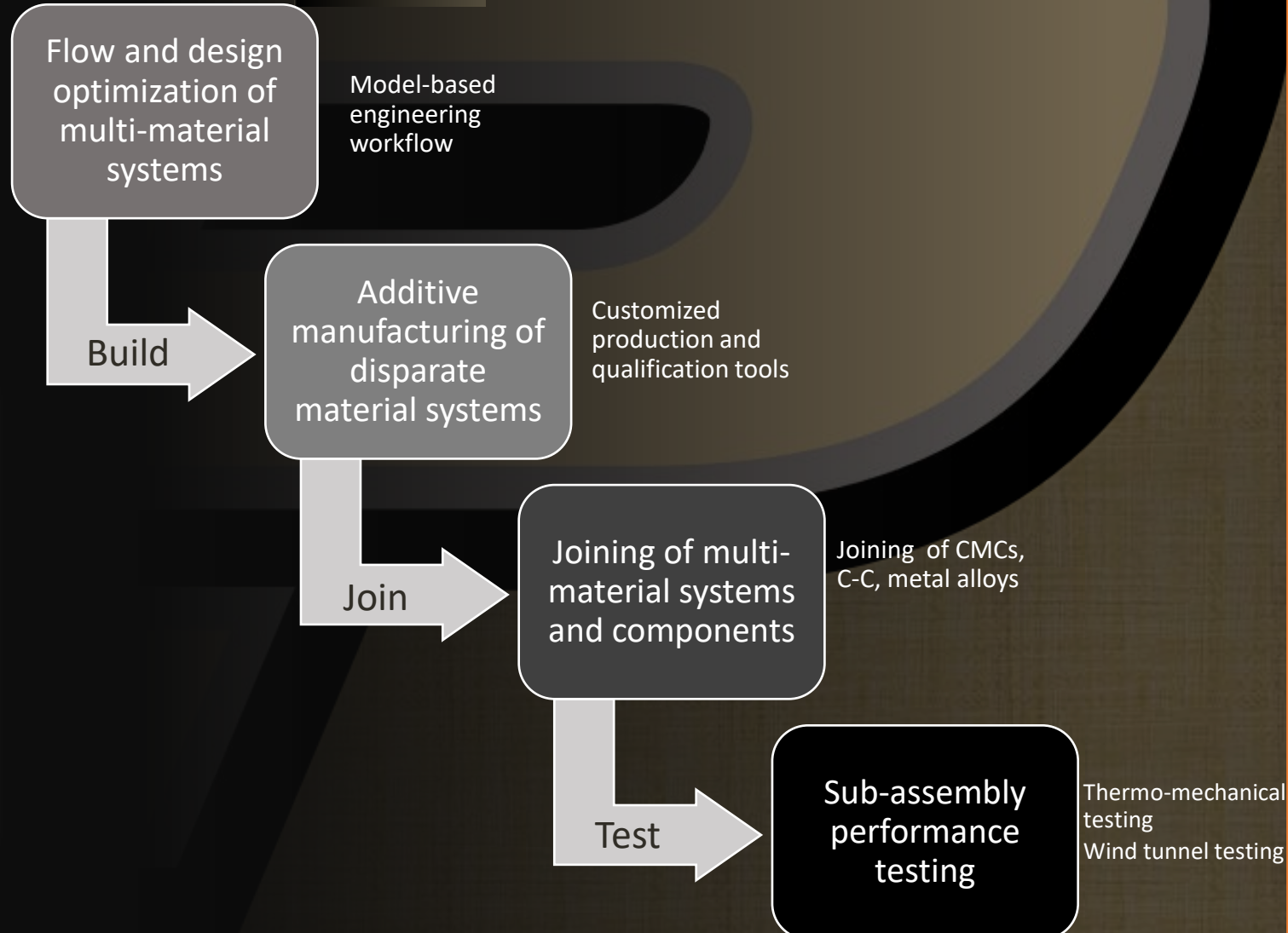
- Unique additive manufacturing equipment
- Joining and coating stations
- Furnaces and post processing
- State-of-the-art characterization and metrology
- Wide range of novel thermo-mechanical testing
- Adjacent to Mach 8 and Hypulse testing
- Connectivity to equipment on Purdue's campus and synchrotron-based



PARI Hypersonics Lab

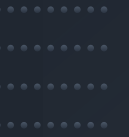
Hypersonics Advanced Manufacturing Technology Center (HAMTC)

Advancing hypersonic vehicle development through manufacturing breakthroughs in support of government and industry partners



PARI Tech Acceleration and Innovation Lab

Global Development and Innovation (GDI)



- Through innovation, research, science, and technology, GDI works to forge practical development solutions for issues in humanitarian assistance, food security, education and youth development, environment, energy, and data science.
- GDI leverages the university's research, learning, and innovation capabilities to accelerate solutions to some of the world's most intransigent issues.
- GDI works to support the U.S. Agency for International Development on multiple projects providing innovation and applied research approaches to develop practical policy solutions for complex systemic issues requiring humanitarian assistance.
- GDI innovates to mitigate, adapt, and build resilience in support of humanitarian missions with the goal of building stability, a key for global security.



PARI Tech Acceleration and Innovation Lab

Digital Innovation In Agri-Food Systems Laboratory (DIAL)

- DIAL Ventures tackles problems facing the United States and the world, such as food safety, supply-chain shortages, sustainability, and environmental impact.
- Through innovation, DIAL strives to make the lives of all of us in this distributed manufacturing system increasingly better for years to come.
- PARI recognizes food stability is part of the larger economical and societal national security ecosystem.



DIAL uses a threefold strategy:

DIAL creates an alternate path to develop new ideas and de-risk startups, closing gaps between external perceptions and internal cultures of innovation through deep industry partnerships.

DIAL's fellowship program provides top entrepreneurs with on-the-job training to develop successful innovative agri-food technology companies.

Investment partners provide capital for DIAL's studio of companies with an opportunity for significant returns on investments.

PARI Infrastructure Innovation Lab

Infrastructure Research and Innovative Solutions (IRIS)

- Through IRIS, researchers explore the materials and construction that will build the next generation of facilities for national security and defense applications, and energy and power infrastructures.
- Current projects include:
 - Teaching machines to classify and organize reconnaissance image data
 - Resilient Extra-Terrestrial Habitat Engineering (RETH)
 - Probability of detection study for steel bridge inspection
 - Seismic response of structural walls with reinforcement and geometric discontinuities
 - Structural integrity of steel gravity framing systems - Purdue slab component tests
 - Response of fire loading on multi-story continuous steel columns
 - Performance evaluation of crack and deck sealants for concrete bridge decks



Robert L. & Terry L. Bowen Laboratory

PARI – NSWC Crane Collaboration

- Contract with NSWC Crane Microelectronics through Sept 2024
 - 5 task areas
 - PARI Personnel at West Gate
 - Anticipating significant expansion in this area (ME Commons)
- LOI for cleanroom space at Foundry 1 (Westgate)
- Hypersonics CRADA

- Future Opportunities
 - Microelectronics
 - Hypersonics
 - Energetic Materials
 - Optical Materials